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FUNCTIONAL DIVERSITY OF ROTIFERS, NEW INSIGHTS INTO COMMUNITY ASSEMBLY

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While the trait-based approach is widely used in plant research, it is in its infancy and limited to a few studies in aquatic ecology. We focused on how water residence time (WRT) influences functional diversity (FD) of rotifers as inferred from morphological traits. The wide variety of rotifer morphology is surprising and essentially reflects species adaptation to the environment. Specifically rotifers, due to their short generation time and important role in the aquatic food web, can serve as a model system to investigate how the environment shapes FD. We used Rao`s quadratic entropy (FD_Q) and community-level weighted mean trait (CWM) values to investigate FD of rotifers from Lake Tovel (Italy) during the ice-free period (May to November) for the years 2002-2006. We analysed the factors and processes driving rotifer FD_Q by generalized linear squares regression, logistic regression, and non-metric multidimensional scaling. Furthermore, we compared FD_Q to FD generated by null-models varying species richness and abundance to investigate trait convergence and divergence. Among the six traits used, FD_Q based on trophi type and body size of rotifers was best related to WRT, biovolume of large algae (> 30 µm) and the months August and September. Survival, feeding, and predator avoidance of rotifers are related to trophi type and body size, and this explained their general importance for rotifer FD. Biovolume of large algae decreased FD_Q, and we attributed this to the more difficult handling of large algae during feeding. The months August and September increased FD_Q, and we attributed this to reduced development time due to higher water temperatures. Remarkably, WRT decreased FD_Q; rotifers with a malleate or malleoramate trophi were positively related to large WRT values, while rotifers with virgate or incudate trophi were negatively related to WRT but positively to algal biovolume. We attribute the alternating pattern of these rotifer guilds to competition on overlapping food sources. Comparison of FD_Q to null-matrices indicated both trait convergence and divergence. A threshold value of FD_Q = 0.39 discriminated trait convergence from divergence. In cases where null-models led to the same indication of trait patterns, competitive exclusion could be identified as the driving factor of community assembly. Our study is the first to apply the FD approach on rotifers, and we could outline general principles of rotifer community assembly.